NIGHTINGALE
MULTI FUNCTION MODEM

USER GUIDE

PACE

APPROVED for use
with telecommunication systems
run by British Telecommunications
in accordance with the conditions
in the instructions for use.

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PACE NIGHTINGALE MODEM

Instructions for installation and use.

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1. EQUIPMENT CONNECTIONS

The Nightingale modem is suitable for connection to two-wire telephone circuits.

Nightingale should not be used in conjunction with a payphone. It may be used on either loop-disconnect or MF tone dialling circuits.

Equipment with unmarked ports should not be connected to Nightingale in case hazardous voltages may be placed on the telephone line under fault conditions. If you are unsure of whether a piece of equipment should be connected to this modem, you should seek the advice of a competent engineer.

The approval of this modem for connection to the British Telecom public switched telephone network is invalidated if the apparatus is subject to any modification in any material way not authorised by BABT or it is used with or connected to external control software or external control apparatus which causes the operation of the modem or associated call-setup equipment to contravene the requirements of the standard set out in BABT/SITS/82/005S/D.

All apparatus connected to this modem and thereby connected directly or indirectly to the British Telecom public switched telephone network must be approved apparatus as defined in Section 16 of the British Telecommunications Act 1981.

Mains lead connection

IMPORTANT : The wires in the mains lead provided with the Nightingale modem are coloured in accordance with the following codes :-

Blue : Neutral
Brown : Live

As these colours may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows :

The wire which is BLUE must be connected to the terminal which is marked with the letter N or coloured BLACK.

The wire which is BROWN must be connected to the terminal which is marked with a letter L or coloured RED.

THE MAINS PLUG FUSE MUST BE FITTED WITH A FUSE RATED AT 3 AMPERES. Such a fuse may be marked 3A or 3/250. If a 13 Ampere fuse is already fitted in the mains plug this MUST be removed and fitted with a 3 Ampere fuse.

Telephone lead connection

The Nightingale modem is provided with a lead to connect to the standard British Telecom type 600 telephone jack socket. The plug terminating this lead is known as type 431A. If you do not have a suitable socket fitted, then you must ask British Telecom to fit a socket for you.

If you have a suitable socket then fit the modem plug into the wall socket.

In order to fit the plug to the socket you may have to remove any telephone device already installed in that socket. There is a socket on the rear of the Nightingale modem to which the displaced device may be fitted; this socket is wired in parallel with the standard telephone socket, and the use of the normallly fitted device will not be affected, except when the Modem Connect switch on the front of the Nightingale is depressed.

Data lead connection

The third essential connection to Nightingale is to the terminal or computer in use. Nightingale is fitted with a 5-pin domino female socket at the RS232 port, this socket being compatible with the majority of terminal devices. The wiring of this socket is given in Section 9 of this manual, and if a special cable is required Pace Software Supplies Ltd may be able to supply it. If you wish to purchase the necessary plug you should ask for a male, 5-pin domino DIN plug.

2.RINGER EQUIVALENCE NUMBER (REN)

What is REN?

REN is a customer guide, its main purpose being to indicate the maximum number of telephonic items that should be simultaneously connected to a single telephone line without seriously affecting the bell (or tone) ringing characteristics of the items connected.

The REN value of this equipment is 1.5 (one and a half). To calculate the maximum number of items (usually telephones but not necessarily so) that can be connected to a single exclusive telephone line simply add up all the REN values of the connected equipment and the sum total should be 4 (four) or less. The British Telecom supplied prime instrument is assumed to have a REN of 1 (one) unless otherwise marked and all other equipment should be clearly marked with an appropriate REN.

Please note that if the sum total of the REN (of the connected equipment) is in excess of 4 (four) then the bell volume and/or ringing tone of the equipment connected on a single line at a particular location may become less audible at the installed instrument.

3. INSTALLATION

In order to use Nightingale with a computer or terminal you will require in addition an asynchronous serial interface (RS232 or compatible) and appropriate communications software. Both of these items may or may not be provided with your terminal equipment.

The first stage in setting up your system is to unplug your telephone from the wall socket and connect it into the socket marked 'TELEPHONE' on the back of the modem. The telephone lead from the modem can then be plugged into the free wall socket.

You will find that the telephone may now be used as usual without having to connect the modem to the mains i.e. the modem is 'transparent' when it is not in use.

Now connect the modem into your computer using the serial data lead provided. At least one end of this lead will be terminated with a 5-pin domino DIN plug. This should be pushed firmly into the socket labelled 'RS232' on the rear of the modem. It should be oriented so that the RAISED INDICATOR on the plastic case of the plug is to the LEFT looking from the back of the modem. The OPEN SECTION of the metal surround will be TO THE TOP. The other end of this lead will be fitted with a plug suitable for connection to your terminal equipment and this should be connected appropriately into the equipment. In most cases this will be a second 5-pin domino DIN plug which should also be inserted with the open section of the metal surround to the top.

Finally, ensure that all switches on the modem are OUT and plug it into the mains supply. The POWER/DATA LED on the front panel will glow steady RED indicating that the power is ON.

4. SELF TEST

You will notice on the rear of the modem a switch labelled 'Self Test'. Pressing this switch IN will cause any data which is passed to the RS232 socket to be routed back into the modem as if it were received data. This facility may only be used when the modem is configured for 300/300 baud originate mode. i.e. the switches labelled VIEWDATA/300 BAUD and ORIGINATE/ANSWER on the front panel are OUT, which should already be the case.

To use the modem in Self Test mode, switch your terminal software into its interactive state (this might be referred to as chat, conversational or terminal mode), and configure the serial port on your computer to send and receive at 300 baud. The requirement is that whatever you type at the keyboard should be passed to the serial port of your computer, and characters received at the serial port should be displayed on your screen.

With the SELF TEST switch on the rear panel depressed, the MODEM CONNECT switch on the front panel may also be depressed. All other switches should be OUT. You should now notice that the yellow CARRIER DETECT/LINE HOLD LED is lit indicating that the modem is indeed connected. Try typing a few characters at your keyboard. You will see that the POWER/DATA LED on the front panel of the modem flickers GREEN and then RED with every key press i.e. the character is first transmitted and then 'received' by the modem. If nothing happens check that all switches except MODEM CONNECT and SELF TEST are OUT, and that you have connected the data lead correctly.

When self test is functioning satisfactorily you may assume that you have connected the serial lead properly and that the modem is operating normally at 300 boud. It is not possible to test the modem at 1200/75 baud rates in this way because of the split rates. Note : the SELF TEST switch must remain OUT at all times other than when the modem is being self-tested.

5. 300 baud Full Duplex operation
(Auto-answer host, e.g. bulletin board)

To use the modem for communication with a remote 300/300 baud system, you must first ensure that you have used your terminal software to configure the serial port on your computer to send and receive at 300 baud. Also, check that the data format that your software is expecting is the same as for the system that you are about to dial.

All switches should be OUT i.e. you are in Originate mode for 300 baud, full duplex communication.

Dial the number of the remote system that you wish to access and on hearing the carrier signal (a high pitched whistle), connect the modem by depressing the MODEM CONNECT switch on the front panel. You will notice the yellow CARRIER DETECT/LINE HOLD LED illuminate and you may replace the telephone handset. (Note : certain types of proprietory 'intelligent' telephone systems will cut off the line if the handset is replaced. If this happens simply re-dial the number and put the handset down next to the phone). Having connected the modem, the introductory messages from the remote system will be displayed on your screen, the incoming transmission being indicated by the flashing RED POWER/DATA LED.

Any characters that you type at the keyboard when operating in this mode will be transmitted to the remote system. In this case each transmitted character will produce a GREEN flash on the POWER/DATA LED.

6. 300 baud Full Duplex baud operation
(manually operated host)

In cases where the remote host system is not equipped with Auto Answer, you must first establish a voice link with the remote user. Following this, a data link may be established if one of the users (it doesn't matter which), DEPRESSES the ORIGINATE/ANSWER switch, and the other leaves it OUT. Each user may then operate the MODEM CONNECT switch on their modem to create the data link.

7. 1200/75 baud operation
(e.g. Prestel)

Using the 1200/75 baud configuration you will be able to access Prestel and other similar viewdata systems. Each of these systems transmits data to the receiver at 1200 baud but user responses are returned at only 75 baud. To operate in this mode the TX/RX switch should be IN i.e. RX1200/TX75, the VIEWDATA/300 BAUD should be IN to select Viewdata. All other switches should be left OUT.

Once again, check that your terminal software is correctly configured in terms of baud rates and word format then dial the number of the viewdata system that you wish to access (Note : Prestel uses 7 bit word, even parity and 1 Stop bit).

When you hear the carrier signal depress the MODEM CONNECT switch and the introductory page will be displayed. The front panel LED indicators will operate in the same way as for 300 baud mode.

8. 75/1200 baud operation

To operate the modem so that transmission is at 1200 baud and reception is at 75 baud, the TX/RX switch should be left OUT. All other aspects of operation are the same as in the discussion on 1200/75 baud use above.

One use of this setting is for uploading information to a viewdata system such as Prestel although you will require special software to allow this.

The most important use is for 1200 baud file transfers using XMODEM type protocols. One user, the receiver would initialise for receive 1200/send 75 andf the other for send 1200/receive 75. This allows the bulk of the data to transfer at 1200 baud while the 'hankshaking' takes place at a slower 75 baud.

9. Getting started quickly

Installation

NOTE : It is imperative that you read Sections 1 & 2 of this manual before proceeding with this section.

1) Disconnect your telephone from the wall socket and plug it into the socket marked TELEPHONE on the rear of the modem.

2) At least one end of the serial cable supplied with the modem will be fitted with a 5-pin domino plug. Connect this into the socket labelled RS232 on the rear of the modem. The raised indicator on the plastic sheath of the plug should be to the left when viewed from the rear. Note also that the gap in the metal part of the plug will be to the top.

   The other end of this lead must be connected to the computer. Normally both ends will be fitted with a 5-pin domino connector and the cable is reversible. Once again the gap in the metal surround must be to the top.

3) Plug the modem into the mains and check that the POWER/DATA LED on the front panel is illuminated steady RED.

4) At this point you may self test the modem by depressing the SELF TEST switch on the rear panel. This will only function at 300/300 baud so the front panel switches must be set accordingly :

   Originate/Answer - OUT
   Viewdata/300 baud - OUT
   Modem connect - IN

You must ensure that your communications software is also configured at 300/300 baud rate settings. Note that the Self Test switch should only be depressed for Self Test purposes and should be left OUT at all other times.

5) To use the modem for accessing a bulletin board or other 300/300 baud host system, configure your software appropriately and then select the following settings on the modem.

Originate/Answer - OUT
Viewdata/300 baud - OUT

If you are using the modem to access Prestel or some other viewdata system the switches should be set as follows :

RX1200/TX75 - IN
Viewdata/300 baud - IN

Now, dial the appropriate number and on hearing the carrier signal, depress the Modem Connect switch. The yellow LED labelled CARRIER DETECT/LINE HOLD will illuminate while the carrier is present.

You will now be in a position to communicate with the remote system by typing at your keyboard and each key press will produce a green pulse on the POWER/DATA LED. Incoming data will cause this LED to pulse RED.

6) When you have finished your terminal session the call may be terminated by releasing the MODEM CONNECT switch. After a short delay the yellow CARRIER DETECT/LINE HOLD light will go out indicating that the modem no longer has control of the line.

The above sequence of operations refers to remote systems which possess Auto-Answer capability. In other cases a voice link must first be established. Following this, the data link may be created by ensuring that one of participants is operating in 'originate mode' and the other is in 'answer mode' before both parties connect their modems. It is important to remember that one modem must be set to its 'originate' mode and the other to 'answer' mode in order that a connection may be established.

If the telephone handset is lifted before the modem is disconnected a voice link may be re-established in cases where the remote system is not Auto Answer.

10. Front Panel Description

Switch 1 - Modem Connect

This switch, when depressed, allows the modem to connect to the telephone line.

LED 1 - Carrier detect/Line hold

This LED indicates whether or not the modem has locked on to a carrier generated by the remote host.

LED 2 - Power/Data

When the modem is connected to the mains but is 'idle' i.e. not transmitting or receiving, this light will be illuminated steady red. Incoming data will cause the LED to flicker bright RED and outgoing transmissions will produce green flickering.

Switch 2 - TX/RX - Originate/Answer

The third switch from the left determines whether the modem is originating or answering the call. Whenever two modems are connected together, one must be in originate mode and the other must be in answer mode.

If viewdata baud rates are in use this switch determines whether the modem transmits or receives at 1200 baud.

Switch 3 - Viewdata/300 baud

This is the baud rate select switch. It should be left OUT for 300/300 baud full duplex operation and switched IN for viewdata baud rates i.e. 1200/75 or 75/1200.

Switch 4 - CCITT/Bell

Bell 103 operation is prohibited by BABT and the approval of this modem is dependent on the CCITT/BELL switch being disabled.

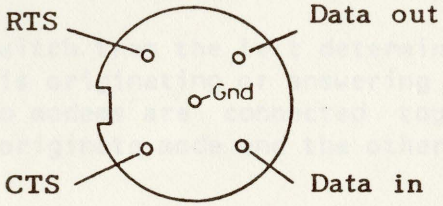
11. Rear panel description

Switch 5 - Self test

It is useful during the installation of a modem, or when problems have been encountered during communication, to be able to quickly test that the modem itself is functioning. Depressing the self test switch on the rear panel while the modem is connected and configured for 300 baud originate mode, will route transmitted data straight back into the modem. Thus it is possible to see at a glance if the modem is transmitting and receiving correctly.

RS232

This consists of a 5-pin domino socket mounted on the modem rear panel. The pin allocations are illustrated in the figure below :



RS232 connections viewed from rear of modem.

Telephone

The modular BT plug from your telephone should be fitted into this socket allowing the telephone lead from the modem to be plugged into the free wall socket.

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